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04/14/97

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PROVISIONAL APPLICATION NUMBER

SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
60/043,835 PROVISIONAL	04/14/97				

APPLICANTS

TIMOTHY L. TIMMERMAN, HESPERIA, CA; TIMOTHY L. TIMMERMAN, II, HESPERIA, CA.

CONTINUING DATA********
VERIFIED

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FOREIGN/PCT APPLICATIONS********
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Foreign priority claimed / 35 USC 119 conditions met / Verified and Acknowledged (Examiner's initials)	AS FILED	STATE OR COUNTRY	SHEETS DRWGS.	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED	ATTORNEY'S DOCKET NO.
☐ yes ☐ no / ☐ yes ☐ no	→	CA	14			$75.00	

ADDRESS

TIMOTHY L TIMMERMAN
9845 SANTA FE EAST
P OB OX 402563
HESPERIA CA 92340-2563

TITLE

LATERAL FORCE RESISTING SYSTEM

U.S. DEPT. OF COMM./ PAT. & TM—PTO-436L (Rev.12-94)

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61581 U.S. PTO
60043835
04/14/97

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

06/05/1997 DNASH1 00000051 60043835
01 FC:214 75.00 OP

PTO-1556
(5/87)

Attorney's Docket No. _____ **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: TIMOTHY L. TIMMERMAN

For: LATERAL FORCE RESISTING SYSTEM

Box Provisional Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

COVER SHEET FOR FILING PROVISIONAL APPLICATION
(37 C.F.R. § 1.51(2)(i))

WARNING: *"A provisional application must also include a cover sheet identifying the application as a provisional application. Otherwise, the application will be treated as an application filed under § 1.53(b)(1)." 37 C.F.R. § 1.53(b)(2)(i).*

NOTE: *"A complete provisional application does not require claims since no examination on the merits will be given to a provisional application. However, provisional applications may be filed with one or more claims as part of the application. Nevertheless, no additional claim fee or multiple dependent claims fee will be required in a provisional application." Notice of December 5, 1994, 59 FR 63951, at 63953. "Any claim filed with a provisional application will, of course, be considered part of the original provisional application disclosure." Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,209.*

NOTE: *"A provisional application shall not be entitled to the right of priority under § 1.55 or 35 U.S.C. 119 or 365(a) or to the benefit of an earlier filing date under § 1.78 or 35 U.S.C. 120, 121 or 365(c) of any other application." 37 C.F.R. § 1.53(b)(2)(ii).*

NOTE: *"No information disclosure statement may be filed in a provisional application." 37 C.F.R. § 1.51(2)(b). "Any information disclosure statements filed in a provisional application would either be returned or disposed of at the convenience of the Office." Notice of December 5, 1994, 59 FR 63591, at 63594.*

NOTE: *"No amendment other than to make the provisional application comply with all applicable regulations, may be made to the provisional application after the filing date of the provisional application." 37 C.F.R. § 1.53(b)(2).*

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on APRIL 14, 1997 (date), in an envelope as "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. 1.10, Mailing Label Number EI174257399US addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

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3. Address(es) of the inventor(s), as numbered above (37 C.F.R. § 1.51(a)(2)(i)(C)):
   1. 7982 ESCOBEDO AVE, HESPERIA, CALIFORNIA 92345
   2. 7210 LYONS AVENUE, HESPERIA, CALIFORNIA 92345
   3. __________

4. The title of the invention is (37 C.F.R. § 1.51(a)(2)(i)(D)):
   LATERAL FORCE RESISTING SYSTEM

5. The name, registration, and telephone number of the attorney *(if applicable)* is (37 C.F.R. § 1.51(a)(2)(i)(E)):
   Name of attorney: __________
   Reg. No. __________ Tel. ( ) __________

   (complete the following, if applicable)

   ☐ A power of attorney accompanies this cover sheet.

6. The docket number used to identify this application is (37 C.F.R. § 1.51(a)(2)(i)(F)):
   Docket No.: __________

7. The correspondence address for this application is (37 C.F.R. § 1.51(a)(2)(i)(G)):
   9845 SANTA FE EAST.
   P.O. Box 402563, HESPERIA, CA. 92340-2563

8. Statement as to whether invention was made by an agency of the U.S. Government or under contract with an agency of the U.S. Government.
   (37 C.F.R. § 1.51(a)(2)(i)(H))

This invention was made by an agency of the United States Government, or under contract with an agency of the United States Government.

☒ No.

☐ Yes.
The name of the U.S. Government agency and the Government contract number are: __________

13. Method of fee payment

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P.O. Address

____

considerations or design requirements necessitate a hybrid of a slab and a stem wall. This results in the use of short concrete walls extending from a few inches to a few feet above the level of the concrete floor.

The site where the building is to be erected is first graded (leveled). Wooden boards are nailed together to create a 'form' or mold for the foundation (slab, footing, stem wall). The forms mark the edges of the foundation. Next, wet concrete is poured into the form and the surface is smoothed and the concrete is allowed to harden. As the concrete hardens, bolts are partially imbedded in the top of the foundation with the threaded end of each bolt protruding out of the foundation. The bolts are embedded wherever a wall will contact the foundation / stem wall to provide a means of securing the wall to the foundation.

The frame of the walls are fabricated next. Each wall frame is composed of several elements. In North America, the wall frames of most homes and small buildings use boards having cross sectional dimensions of 2"x4", 2"x6", or 2"x8". At the base of the wall frame is a board called the mud sill. The mud sill is usually a 2"x4" board chemically treated to resist rotting. The studs are nailed on top of the mud sill. The studs are generally 2"x4" boards standing on end usually 16" apart. On top of the studs is a board called the top plate which is nailed to each stud. The top plate is usually a 2"x4" board. The wall frame is nailed together while all the parts are lying flat on the foundation. Holes are drilled through the mud sill for the foundation bolts to pass through the mudsill. After the wall frame is nailed together, the wall frame is tilted to a vertical orientation. The wall frame is put in its finished location with the foundation bolts protruding through the holes drilled in the mud sill. The wall frame is braced until the adjacent wall frames are in

4'x8' sheets that vary from ¼" to over 1" in thickness. Plywood is composed of many thin layers of wood glued together under pressure with the grain pattern of adjacent layers perpendicular to each other for strength.

Review of damage following the Northridge earthquake, revealed that many plywood sheathed shearwalls failed under the seismic forces. The nailing of the sheathing in the field during construction leads to many failures. Nails driven through the sheathing miss the frame member they were intended to penetrate creating 'shiners'. Nail heads penetrate the skin of the sheathing during nailing which weakens the sheathing and allows the nails to be pulled through the sheathing under load conditions as well as inducing failures in the integrity of the sheathing. Shearwall fabrication requires regular nail spacing of 3"-12" depending on the design requirements. Current field fabrication techniques are not sufficiently accurate to consistently meet the design specifications. Therefore every shearwall panel may be nailed differently and many may be installed with fewer nails than required to handle the required design load.

The rise in land prices has caused the building of more multiple floor dwellings to raise housing density. Multiple floors significantly increase lateral loads and thus increase the use of field fabricated sheathed shearwalls. In many multiple story buildings the entire outside of the building may be sheathed.

Consequently many of the building departments in California are limiting sheathed shearwalls to a maximum height/width ratio of 2:1. Where walls are typically eight feet high, the minimum shearwall width would be four feet. This restriction has implications throughout a building. At the front of a garage narrow shearwalls, two to three foot wide, are common.

fabricated shearwall was ever built in exact compliance with the design, the steel attachment hardware would likely fail before the shearwall. In most cases the steel attachment hardware is fabricated by folding steel strips with a few tack welds. In practice the folds provide the necessary flex in the steel attachment hardware to induce failure. In other cases, attaching the steel hardware to the studs induces cracking of the studs.

Some developers and building departments have been examining the feasibility of using "metal studs" to create the frame of a building. This has the benefit of simpler fabrication. The elements of the wall frame are attached to each other with sheet metal screws or other suitable fasteners, and the metal studs do not split like many boards do when fasteners are driven into them. The metal studs may be cut to exact size with metal shears eliminating the need for dangerous power saws. The metal studs have holes fabricated in them to accommodate electric wiring eliminating the need to drill holes through wooden members wherever wiring is needed. Metal studs alone are not very strong compared to wood, however, metal studs are less expensive than wood. Their advantage is that when the metal studs are used to create a vertical diaphragm or panel by the application of sheathing the resulting panel may support almost as much vertical load as its wooden counterpart at a fraction of the cost.

Summary of the Invention

In accordance with the present invention, lateral force resistance of a building frame is improved by substituting a lateral force resisting system, which includes a rigid structural panel, foundation bolt placement template, and holdowns, in place of conventional sheathed shearwalls. The elimination of in-field fabrication of sheathed shearwalls

In another aspect of the present invention, the foundation bolt placement template may incorporate a central bolt platform to accurately locate a bolt to further secure the center of the rigid structural panel. A central bolt securing the rigid structural panel to the foundation will provide a greater resistance to high lateral loads at the frame/foundation interface.

A further aspect of the present invention uses holdowns outside the boundary of the rigid structural panel to further secure the rigid structural panel to the foundation. Because the holdowns engage the foundation bolts outside the boundaries of the rigid structural panel sources of weakness at the frame /foundation interface are minimized, that is, no elongated or extra holes through the sill plate, and no interference between the holdown, the foundation bolts, and wall frame members. The holdown as practiced in the present invention, has improved load capacity over conventional holdown with minimal deformation, and thus improved resistance to cyclic loads over conventional holdowns. The holdown of the present invention, is also sized to fit within the cross sectional space of a wall frame member, such that when installed, a wall frame member, 2"x4", 2"x6", or 2"x8" as appropriate may be used to furr the side of the rigid structural panel above the holdown, and completely shade the holdown, thus allowing the lateral force resisting system to be easily integrated into conventional building framing. In the preferred embodiment of the present invention, the holdown generally resembles a folded metal strap capturing a metal pin in the fold. The metal pin has a transverse hole which accommodates a holdown screw. The holdown screw extends perpendicularly from the metal pin through a slot in the metal strap and engages a foundation bolt through a coupling nut which simultaneously engages the threads of the holdown screw

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a front view of the currently preferred embodiment of the present invention.

FIGURE 2 is a front view of a rigid structural frame configuration suitable for use in the lateral force resisting system of Fig. 1.

FIGURE 3 is a perspective view of the prior art wood framing techniques showing the elements of a building frame and a section of a sheathed shearwall.

FIGURE 4 is a perspective view of the preferred embodiment of the present invention integrated in a building frame as a replacement for a section of a sheathed shearwall.

FIGURE 5 is a front view of an alternate rigid structural frame configuration.

FIGURE 6 is a front view of another alternate rigid structural frame configuration.

FIGURE 7(a)-(c) are various views of the currently preferred foundation bolt placement template according to the present invention.

FIGURE 8(a)-(c) are various views of an alternate foundation bolt placement template according to the present invention.

FIGURE 9(a)-(b) are various views of another alternate foundation bolt placement template according to the present invention.

FIGURE 10(a)-(c) are various views of another alternate foundation bolt placement template according to the present invention.

FIGURE 11(a)-(c) are various views of another alternate foundation bolt placement template according to the present invention.

FIGURE 12 is a detail view of the frame/foundation interface of Fig. 4.

after the concrete is cured, the forms are removed and the foundation bolt placement template is field bent to form a channel to accept a rigid structural frame.

horizontal spacing member 28, and second side member 24 are web member 54 and web member 56, which form triangles such as structural support triangles 58, 60, and 62.

Rigid structural frame 2 includes horizontal spacing member 28, however a suitable rigid structural frame may not include a horizontal spacing member. The addition of horizontal spacing member 28 simplifies the fabrication of the rigid structural frame by bracing the vertical side members during fabrication. The horizontal dimension of a rigid structural frame is more consistent using horizontal spacing member 28, because a bow in first side member 22 or in second side member24 may be removed during fabrication.

In another aspect of the present invention, near bottom end 32 of first side member 22 and bottom end 34 of second side member 24, are transverse holes 9, parallel to sill plate 20. Holes 9 accept bolts such as bolt 30 for attaching holdowns such as holdown 6 and holdown 8 as shown in Fig. 1.

Referring now to Fig. 3, building frame 100 is an example of conventional building framing. Shearwall 101 is formed by fastening sheathing 102 to corner post 104, stud 106, top cap 108, header 110, post 112, trimmer 114 and mud sill 116. Sheathing 102 may be fastened to frame members 104-116 in any conventional manner such as nails or screws. A plurality of fasteners 122 attach sheathing 102 to frame members 104-116, at regular intervals along frame members 104-116 and along periphery 103 of sheathing 102. Holdowns 118 and 120 are secured to corner post 104 and post 112, respectively, within shearwall 101. Holdown 118 and 120 are secured to foundation 124 by a bolt, such as bolt 126, shown penetrating holdown 120 and mud sill 116.

Referring now to Fig. 4, an embodiment of the present invention is shown as a replacement for shearwall 101. In

horizontal spacing member 312 abuts vertical support 302. Horizontal spacing member 314 is about equidistant between sill plate 320 and 338. First end 360 of horizontal spacing member 314 abuts vertical support 302 and second end 362 of horizontal spacing member 314 abuts second side member 328. A plurality of rectangles are formed by the arrangement of first side member 324, second side member top member 338, second side member 328, sill plate 320, vertical support 302 and horizontal spacing members 312 and 314. Within each rectangle thus formed, are a plurality of web members forming structural triangles. For example, within the rectangle formed by first side member 324, top member 338, vertical support 302 and spacing member 312 are web members 364 and 366 which form triangles such as structural triangles 354, 356 and 358. The angular orientation of adjacent web members, and the orientation of web members in adjacent rectangles alternates as shown in Fig. 5.

Rigid structural frame 300 includes horizontal spacing members 312 and 314, however a suitable rigid structural frame may not include horizontal spacing members. The addition of horizontal spacing members 312 and 314 simplifies the fabrication of the rigid structural frame by bracing first and second side members 324 and 328 and vertical support 302 during fabrication. The horizontal dimension of a rigid structural frame is more consistent using horizontal spacing members 312 and 314, because a bow in first side member 312, or in second side member314, or in vertical support 302 may be removed during fabrication.

Referring again more specifically to Fig.'s 1,5, and 6, in another aspect of the present invention, every joint such as joint 21 of rigid structural frame 2, where two or more members join, a truss plate, such as truss plate 7 is pressed into each face of the joint which is common to all the members

end 416 of horizontal spacing member 412 abuts first side member 424, and second end 418 of horizontal spacing member 412 abuts first vertical support 402. First end 470 of horizontal spacing member 472 abuts first vertical support 402, and second end 474 of horizontal spacing member 472 abuts second vertical support 476. First end 460 of spacing member 414 abuts second vertical support 476, and second end 462 of spacing member 414 abuts second side member 428. A plurality of rectangles are formed by the arrangement of first side member 424, second side member top member 438, second side member 428, sill plate 420, first vertical support 402 and horizontal spacing members 412 and 414. Within each rectangle thus formed, a plurality of web members form structural triangles. For example, within the rectangle formed by first side member 424, top member 438, first vertical support 402 and spacing member 412 are web members 464 and 466 which form triangles such as structural triangles 454, 456 and 458.

Rigid structural frame 400 includes horizontal spacing members 412, 414 and 472, however a suitable rigid structural frame may not include horizontal spacing members. The addition of horizontal spacing members 412, 414 and 472 simplifies the fabrication of the rigid structural frame by bracing first and second side members 424 and 428 and vertical supports 402 and 476 during fabrication. The horizontal dimension of a rigid structural frame is more consistent using horizontal spacing members 412, 414 and 472, because a bow in first side member 412, or in second side member414, or in vertical support 402 or 476 may be removed during fabrication.

Referring now to Fig.'s 7(a)-(c), foundation bolt placement template 500 is one aspect of the present invention. Foundation bolt placement template 500 includes bolt platforms 502 and 504, inside face 506, outside face 508 and securing tabs 510 and 512. Bolt platforms 502 and 504 are generally

invention. Foundation bolt placement template 530 includes bolt platforms 532 and 534, inside face 540, and outside face 539. Bolt platforms 532 and 534 are generally horizontal and include holes 536 and 538 respectively. Holes 536 and 538 are provided to allow foundation bolts such as bolt 548 to hang through bolt platforms 532 and 534, supported by foundation bolt nuts such as nut 550, during fabrication of foundation 546. Bolt platforms 532 and 534 are separated by concrete access 544 which allows wet concrete to be easily poured through foundation bolt placement template 530 during fabrication of foundation 546. Outside face 539 foldably joins bolt platforms 532 and bolt platforms 534 along indented and perforated fold line C-C′. Inside face 540 foldably joins bolt platforms 532 and 534 along intended and perforated fold line D-D′. A plurality of fastener points 542 on outside face 539 and inside face 540 allow foundation bolt placement template 530 to be temporarily fastened to an outside form and an inside form such as outside form 501, and inside form 507 of Fig. 26(a), during fabrication of foundation 546. Temporary attachment of foundation bolt placement template 530 to an outside form and an inside form allows accurate placement of foundation bolt placement template 530 which supports foundation bolts such as bolt 548. After foundation 546 has hardened, temporary fasteners securing foundation bolt placement template 530. Outside face 539 and inside face 540 may be folded about 90° along indented and perforated fold line C-C′ and D-D′ respectively. A rigid structural panel such as rigid structural frame 2 may be secured between inside face 540 and outside face 539 using a plurality of fasteners (not shown) through fastener points such as fastener point 542.

Referring now to Fig.'s 9(a) and (b) foundation bolt placement template 560 is a further aspect of the present

bolt support 586 vertically displaced above center bolt platform 574. Removable bolt support 586 is separated from center bolt platform 574 by removable bolt support 584 and removable bolt support 590. Hole 588 of removable bolt support 586 is vertically aligned with hole 580 of center bolt platform 574. Bolt 595 extended through holes 588 and 580, and is supported by nut 598 on removable bolt support 586. After foundation 596 has hardened, temporary fasteners securing foundation bolt placement template 560, and removable bolt supports 584-590 may be removed. Outside face 570 and inside face 572 may be folded about 90° along indented and perforated fold line E-E′ and F-F′ respectively. A rigid structural panel such as rigid structural frame 2 may be secured between inside face 572 and outside face 570 using a plurality of fasteners (not shown) through fastener points such as fastener point 592.

Referring now to Fig.'s 10(a)- (c) foundation bolt placement template 600 is a further aspect of the present invention. Foundation bolt placement template 600 includes bolt platforms 602, and 604, inside face 610, outside face 612 tie plate 613, and securing tabs 618, 620 and 622. Bolt platforms 602 and 604 are generally horizontal and include holes 606 and 608 respectively. Holes 602 and 604 are provided to allow foundation bolts such as bolt 624, to hang through bolt platforms 602 and 604, supported by foundation bolt nuts such as nut 624, during fabrication of foundation 619. Bolt platform 602 and tie plate 613 are separated by concrete access 614, bolt platform 604 and tie plate 613 are separated by concrete access 616, concrete access 614 and 616 allow wet concrete to be easily poured through foundation bolt placement template 600 during fabrication of foundation 619. Outside face 612 foldably joins bolt platforms 602, to plate 613, and bolt platforms 604 along indented and perforated fold line J-J′. Inside face 610 is perpendicular to bolt platforms 602 and

access 654, 656 and 658 allow wet concrete to be easily poured through foundation bolt placement template 630 during fabrication of foundation 631. Outside face 642 foldably joins bolt platforms 632, tie plate 643, tie plate 645, and bolt platforms 634 along indented and perforated fold line L-L'. Inside face 640 is perpendicular to bolt platforms 632 and 634 and joins bolt platforms 632, tie plate 643, tie plate 645, and bolt platforms 634 along inside edge M-M'. A plurality of fastener points 611 on outside face 612 allow foundation bolt placement template 600 to be temporarily fastened to an outside form, such as form 501 of Fig. 26(a), during fabrication of foundation 619. Temporary attachment of foundation bolt placement template 630 to an outside form such as form 511, allows accurate placement of foundation bolt placement template 600 which supports foundation bolts such as bolt 516. Securing tabs 618, 620 and 622 are captured within the wet concrete of foundation 619 during fabrication, and provide lateral force resistance at the frame/foundation interface after foundation 619 has hardened. After foundation 619 has hardened, temporary fasteners securing foundation bolt placement template 600 may be removed. Outside face 612 may be folded about 90°, as shown in Fig. 10(b), along indented and perforated fold line J-J'. A rigid structural panel such as rigid structural frame 300 of Fig. 5 may be secured between inside face 610 and outside face 612 using a plurality of fastener points such as fastener point 611.

Referring now to Fig.'s 12 and 13(a)-(b), in another aspect of the present invention sleeves such as sleeve 243, 245, 247 and 249 are pressed through holes 9 in first side member 22 and second side member 24. Each side member surface which is penetrated by holes 9 is reinforced by having a reinforcing plate such as plate 208 or 210 of Fig.'s 13(a) and (b) pressed into the surface of first side member 22. Teeth, such as

structural frame 200 to foundation bolts such as bolts 203 and 204 by means of coupling nuts 248 and 249 which simultaneously engage holdown screw 222 and 220 and foundation bolt 203 and 204. Locking nuts 250 and 251 are included above coupling nuts 248 and 249 to secure the connection as shown in Fig. 12.

In the currently preferred embodiment of the present invention, holdown screws such as screw 220 are 5/8" steel capscrews having a tensile strength over 180,000 lbs. conforming to ASTM A574. Screw 220 is the principal means of transferring lateral loads to the foundation, therefore, the tensile strength may be selected for the maximum load expected. In a still further aspect of the present invention head 753 of a holdown screw such as screw 216 may be chamfered as shown in Fig. 23 so as not to bind within holdown straps 713 and 721 of Fig.'s 15(b)-(c). Other head configurations have been found to be suitable.

In a still further aspect of the present invention, pins 212 and 218 and holdown screws 216 and 222 may be replaced by a "T" bolt 750 as shown in Fig.'s 25(a)-(b). "T" bolt 750 is left-hand threaded to enable a coupling nut such as coupling nut 249 to simultaneously engage "T" bolt 750 and a foundation bolt such as foundation bolt 204 and tighten as in a turnbuckle. Threaded leg 751 of "T" bolt 750 is not free to move independent of cross member 752 and this simplifies assembly and installation of the lateral force resisting system.

In a still further aspect of the present invention, shown in Fig. 15(c), holdown strap 721 and retaining plate 720 are modified to accommodate a square bodied bolt such as bolt753 of Fig. 22(a)-(b). Additionally, sleeves such as sleeves 243 and 245 shown in Fig. 12 are replaced by a square cross section tube having 1/8" thick walls as shown in Fig. 18(a)-

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VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR	Docket Number (Optional)

Applicant or Patentee: TIMOTHY L. TIMMERMAN

Application or Patent No.: _____

Filed or Issued: _____

Title: LATERAL FORCE RESISTING SYSTEM.

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- [X] the specification filed herewith with title as listed above.
- [ ] the application identified above.
- [ ] the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- [X] No such person, concern, or organization exists.
- [ ] Each such person, concern, or organization is listed below.

Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

TIMOTHY L TIMMERMAN	TIMOTHY L. TIMMERMAN II	
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Signature of inventor	Signature of inventor	Signature of inventor
APRIL 14, 1997	APRIL 14, 1997	
Date	Date	Date

Burden Hour Statement: This form is estimated to take 0.3 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

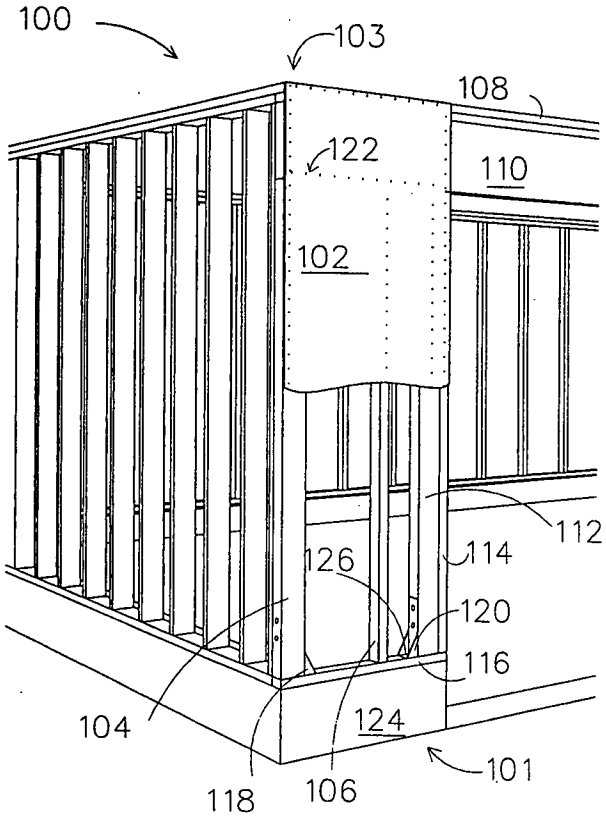

FIG.–3
(PRIOR ART)

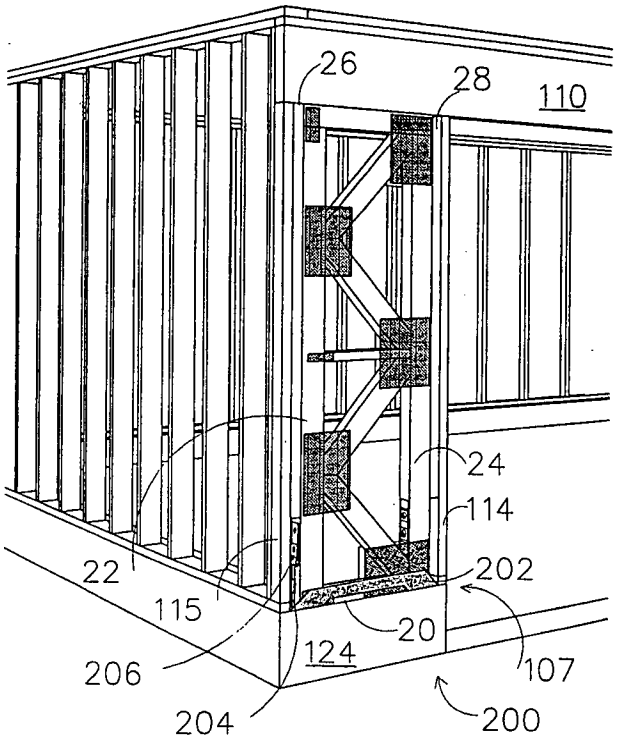

FIG.–4

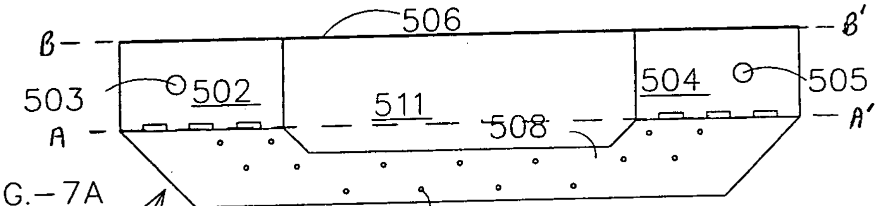

FIG.-7A

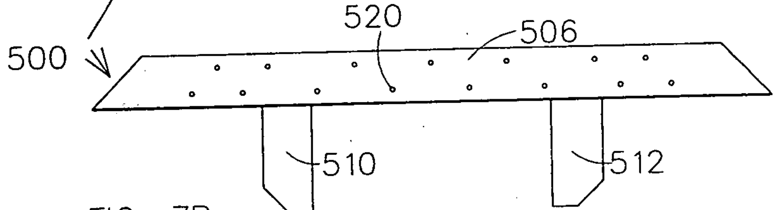

FIG.-7B

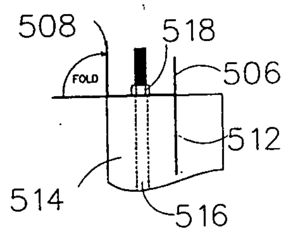

FIG.-7C

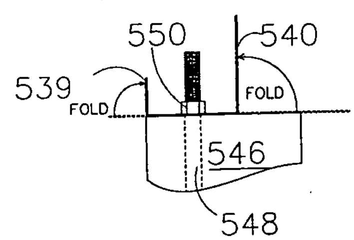

FIG.-8B

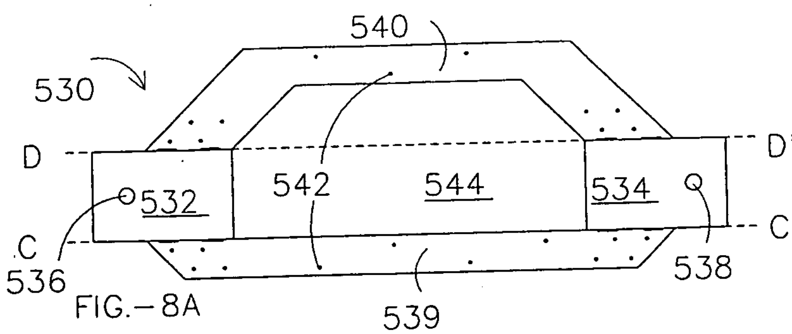

FIG.-8A

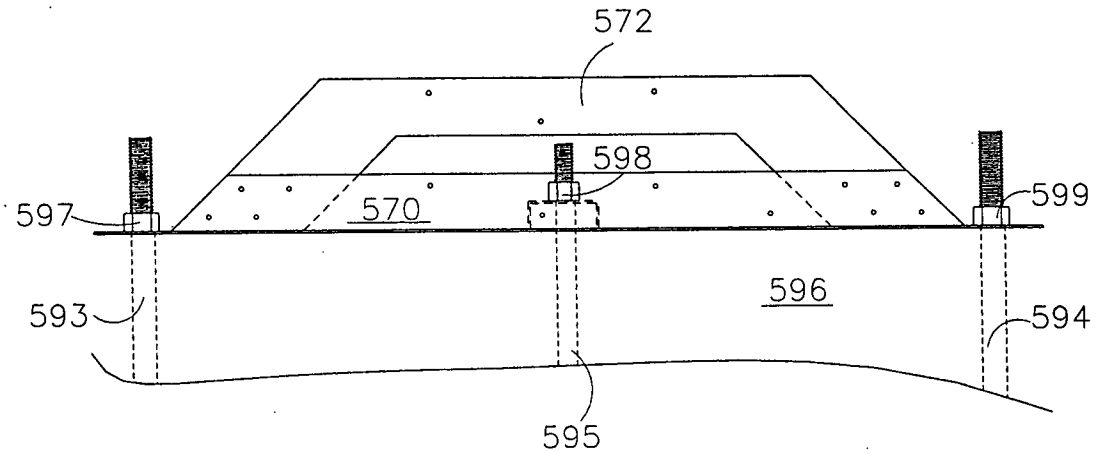

FIG.—9B

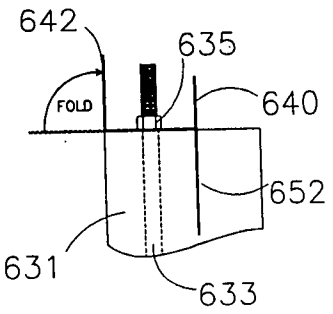

FIG.– 11c

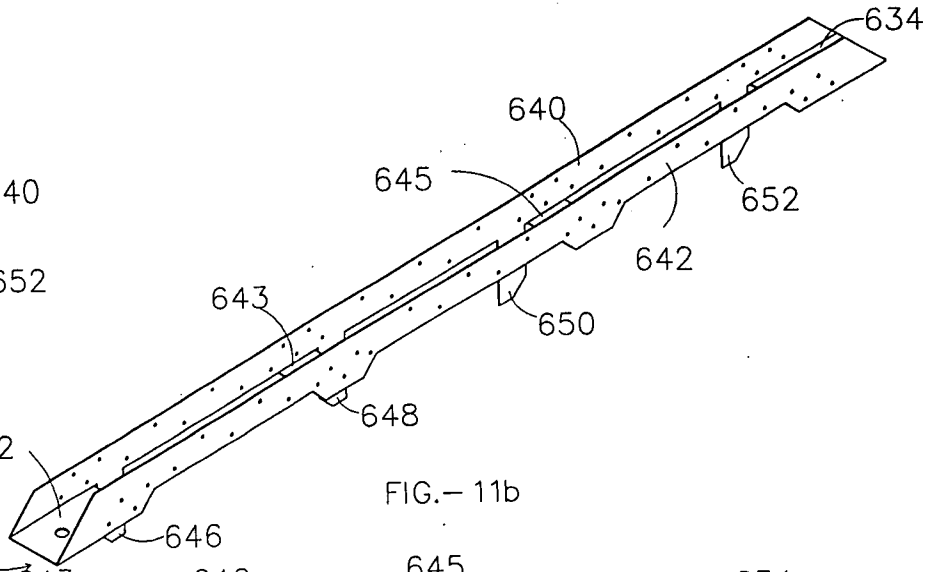

FIG.– 11b

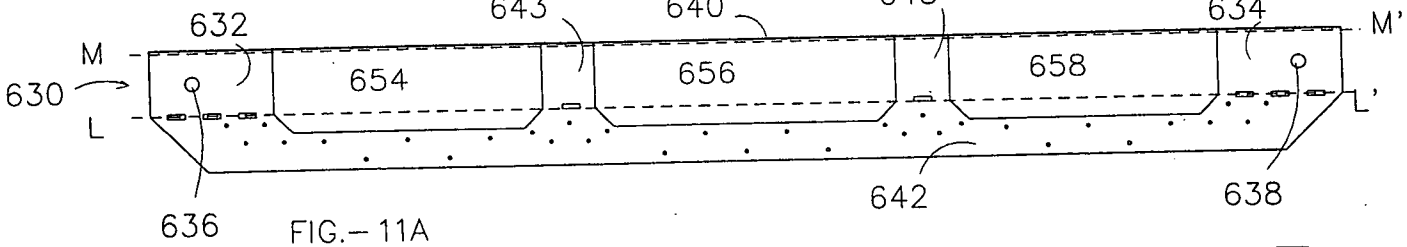

FIG.– 11A

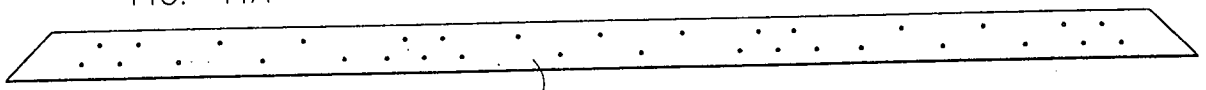

FIG.– 11D

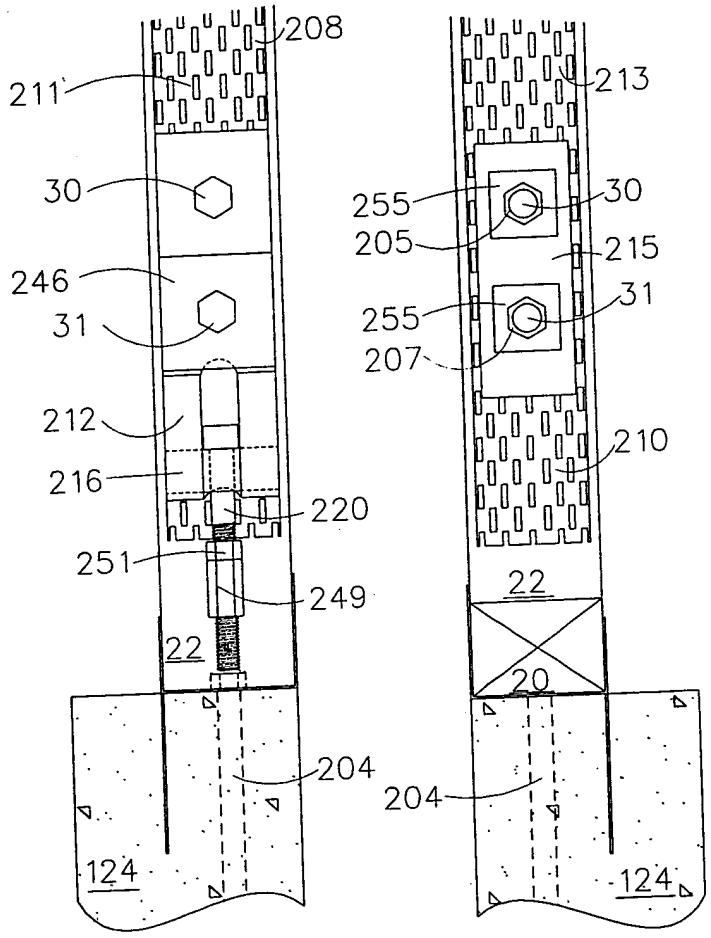

FIG.– 13a

FIG.– 13b

FIG.– 17B

FIG.– 18B

FIG.– 17A

FIG.– 18A

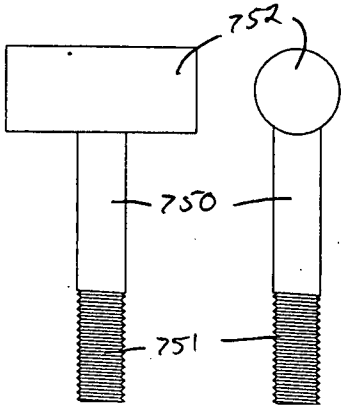

FIG.– 25A FIG.– 25B

FIG.– 19A

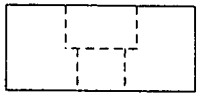

FIG.– 19B

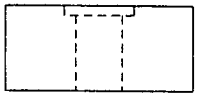

FIG.– 20A

FIG.– 20B

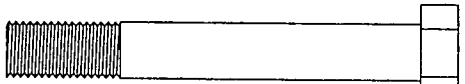

FIG.– 21A

FIG.– 21B

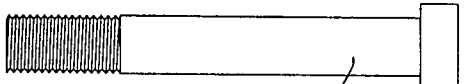

FIG.– 22A

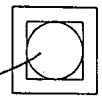

FIG.– 22B

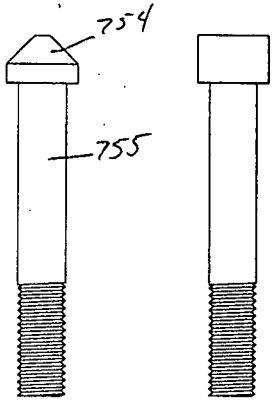

FIG.– 23 FIG.– 24

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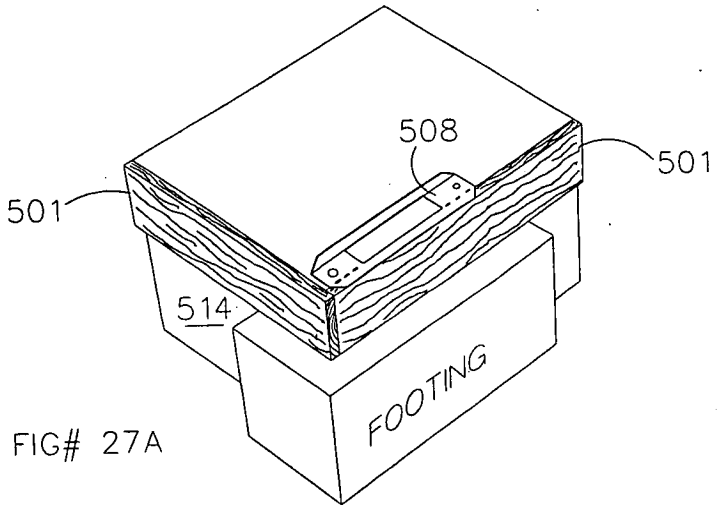
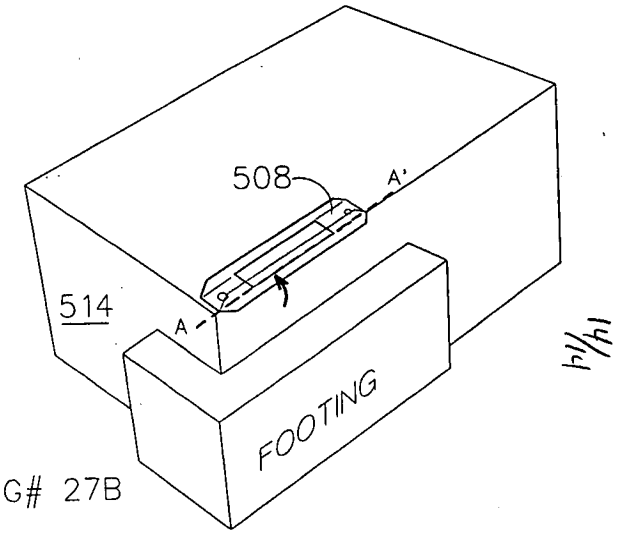


FIG# 27A



FIG# 27B

NON STEM WALL APPLICATION

US006158184A

United States Patent [19]

Timmerman, Sr. et al.

[11] Patent Number: 6,158,184

[45] Date of Patent: Dec. 12, 2000

[54] MULTI-PANE LATERAL FORCE RESISTING SYSTEM

[76] Inventors: Timothy L Timmerman, Sr., 7982 Escobedo Ave.; Timothy L Timmerman, II, 7210 Lyons Ave., both of Hesperia, Calif. 92345

[21] Appl. No.: 09/060,930

[22] Filed: Apr. 14, 1998

Related U.S. Application Data

[60] Provisional application No. 60/043,835, Apr. 14, 1997.

[51] Int. Cl.[7] E04C 5/12; E04C 5/16; E04B 1/98

[52] U.S. Cl. 52/293.3; 52/295; 52/98; 52/481.1; 52/677; 52/699; 52/712

[58] Field of Search 52/293.3, 295, 52/699, 98, 677, 684, 712, 481.1, 483.1

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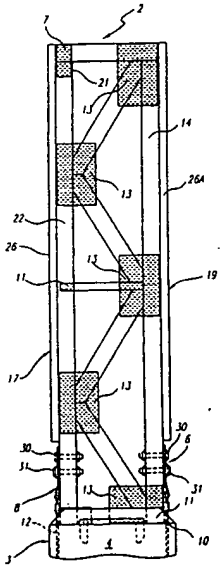
Primary Examiner—Christopher T. Kent

Attorney, Agent, or Firm—Irell & Manella LLP; Paul J. Backofen

[57] ABSTRACT

A lateral force resisting system includes a rigid structural panel and boldowns. A foundation bolt placement template may be used to locate and support the foundation bolts during fabrication of the foundation and to further secure the frame foundation interface. The rigid structural panel may be a vertical truss or a rigid structural frame with a wooden panel covering one side and interconnecting the members of the rigid structural frame. The wooden panel may be made up of multiple panes to tailor the response of the panel to the lateral force load. The boldowns secure the rigid structural panel to the foundation bolts and may be either a folded strap and pin embodiment or self-tightening.

44 Claims, 16 Drawing Sheets



PTO/SB/58 (11-96)
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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR ACCESS OF ABANDONED APPLICATION UNDER 37 CFR 1.14(a)

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In re Application of	
Zimmerman	
Application Number	**Filed**
60/043835	4-14-97
Group Art Unit	**Examiner**

Paper No. 11

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___ (C) an application that claims the benefit of the filing date of an application that is open to public inspection, i.e., Application No. _____, filed _____, or

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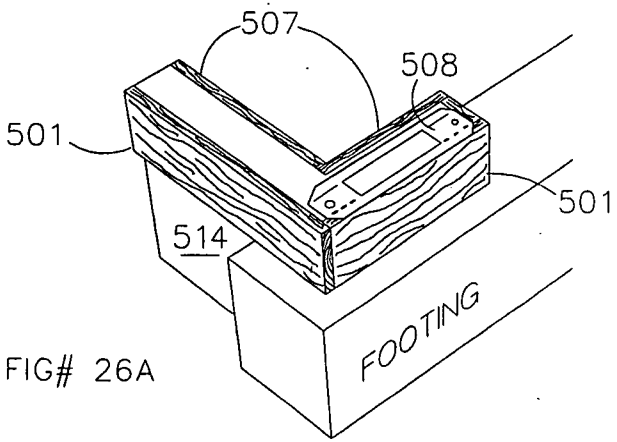
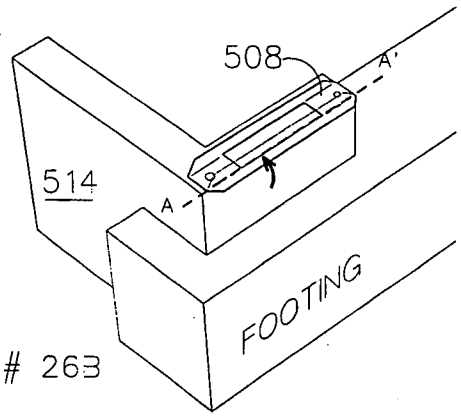


FIG# 26A



FIG# 26B

STEM WALL APPLICATION

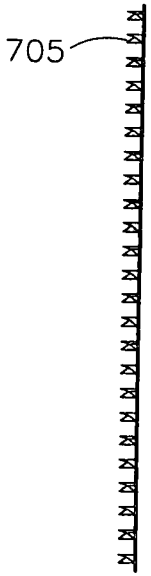


FIG.– 14B

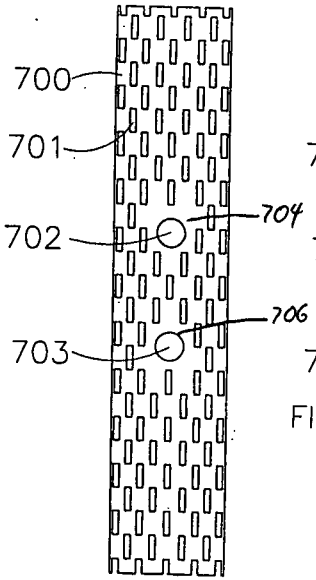


FIG.– 14A

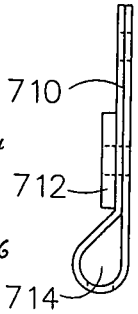


FIG.– 15A

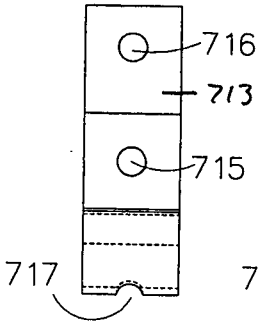


FIG.– 15B

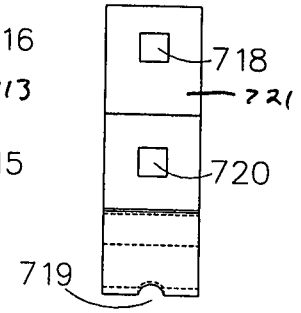


FIG.– 15C

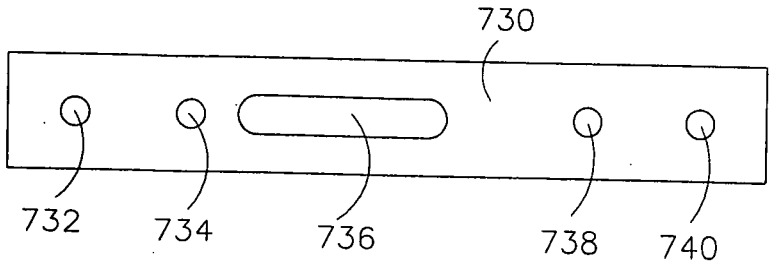


FIG.– 16A

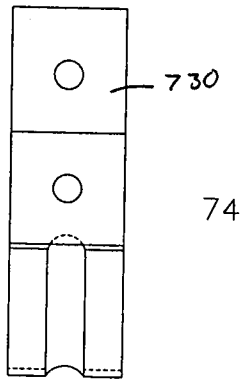


FIG.– 16B

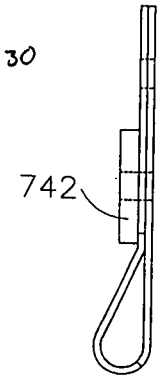


FIG.– 16C

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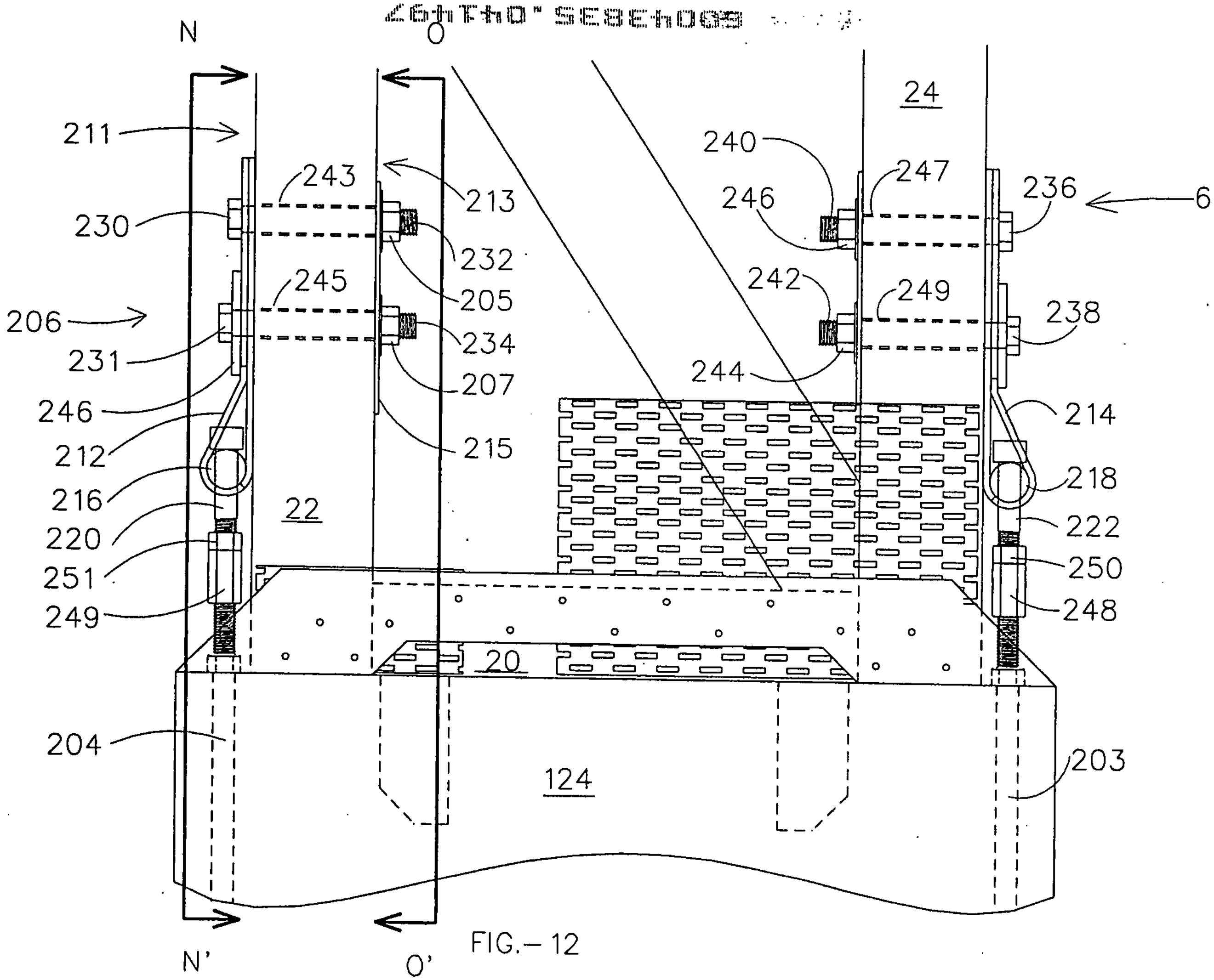

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FIG.—12

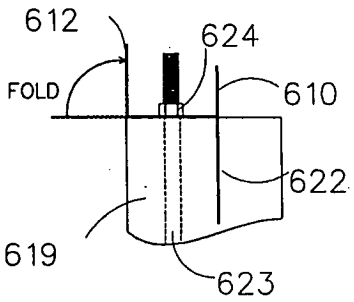

FIG.– 10b

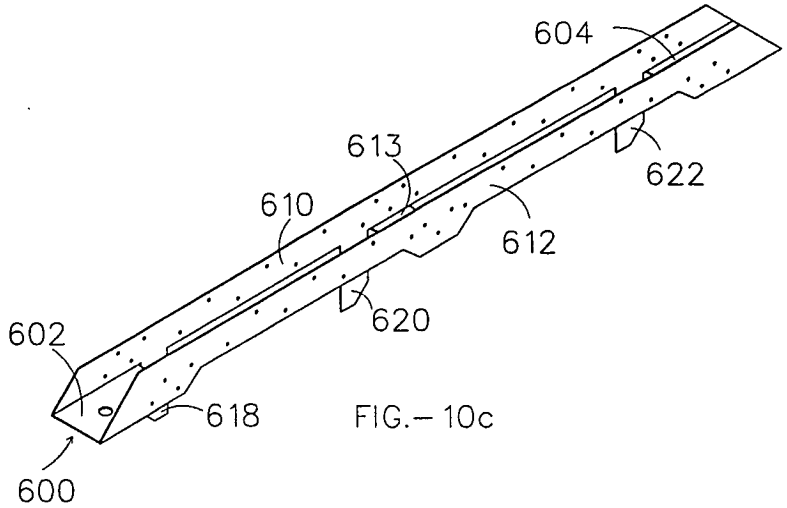

FIG.– 10c

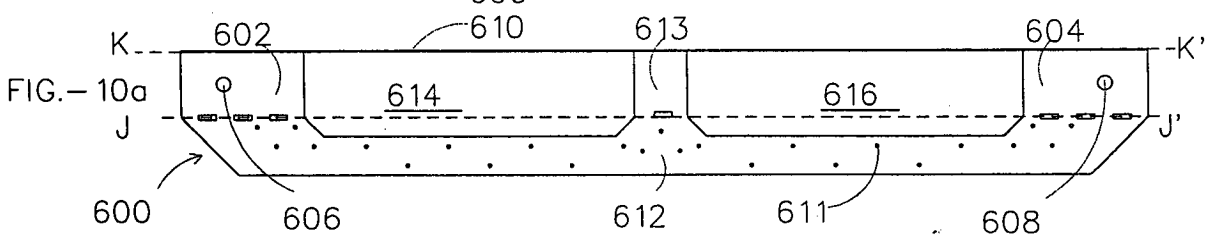

FIG.– 10a

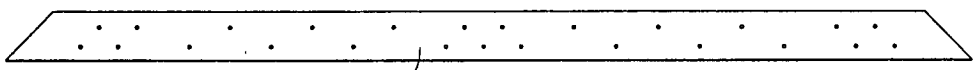

FIG.– 10D

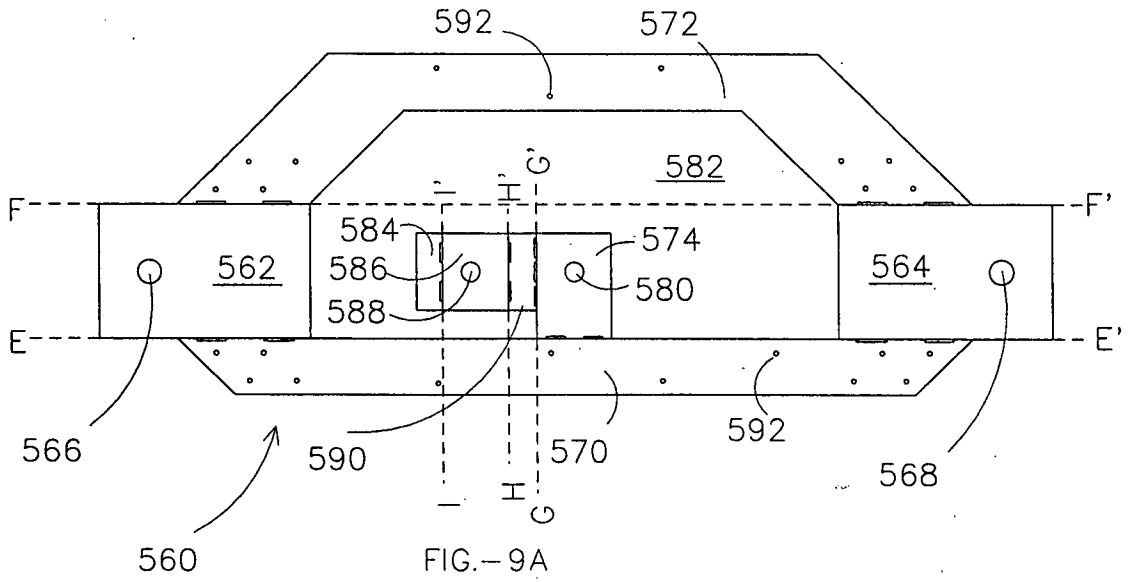
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FIG.—9A

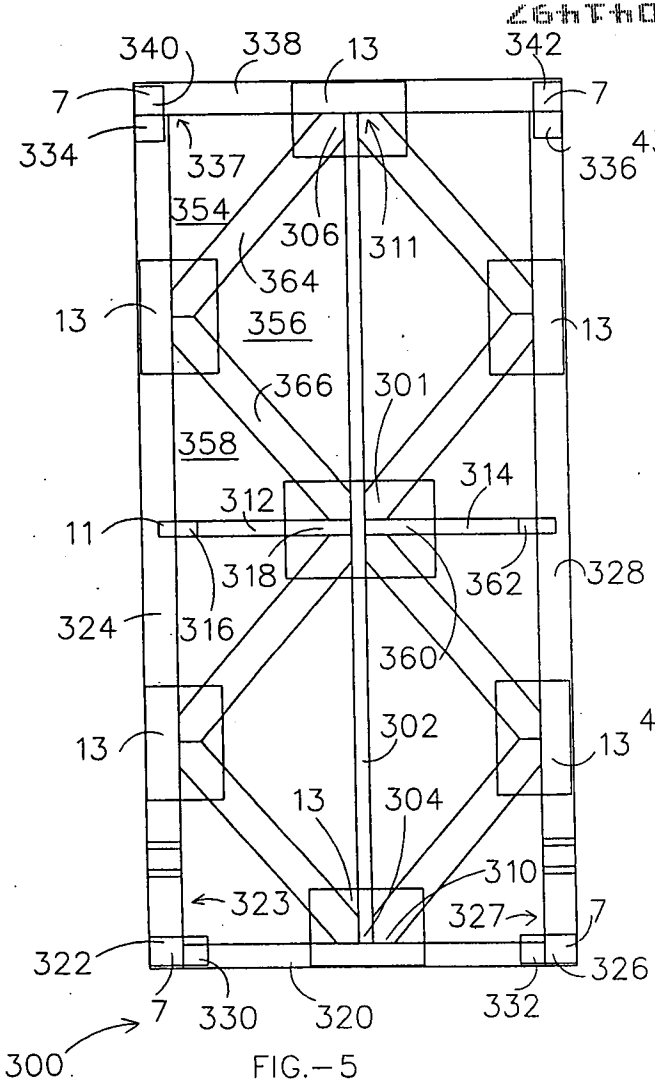

FIG.–5

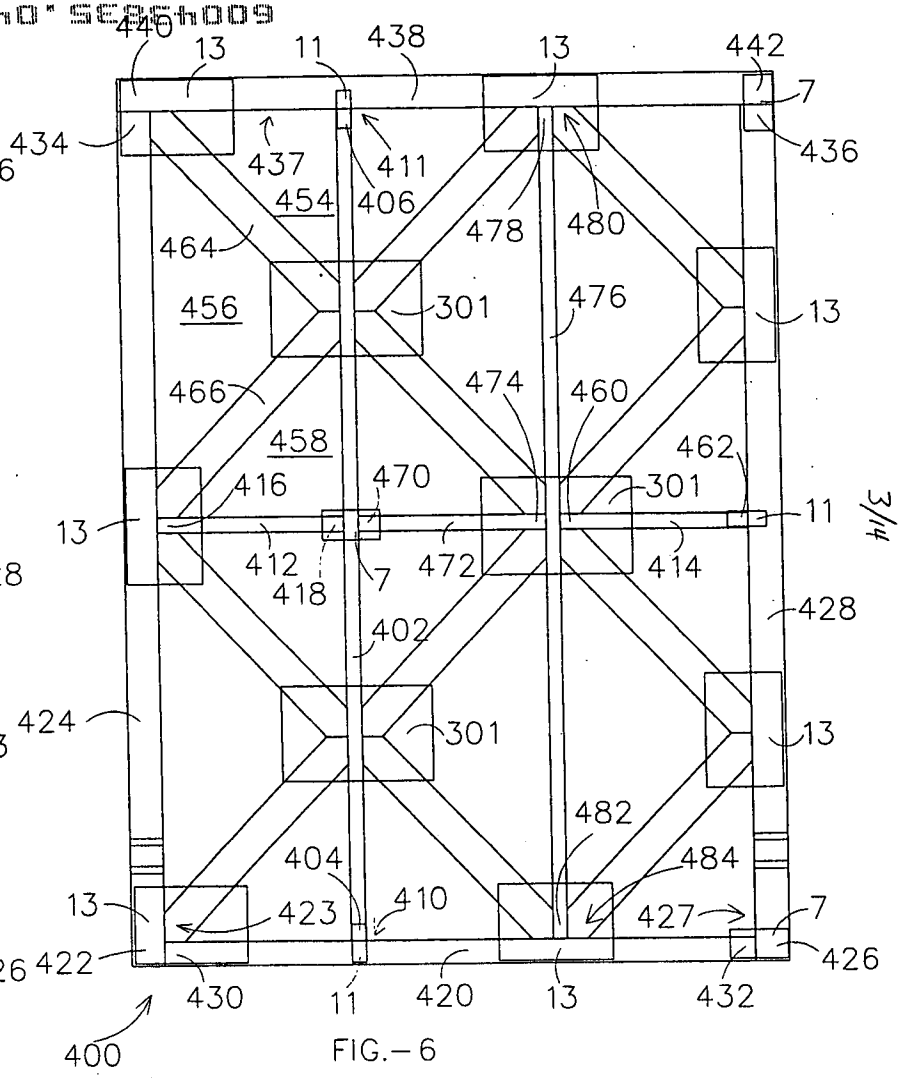

FIG.–6

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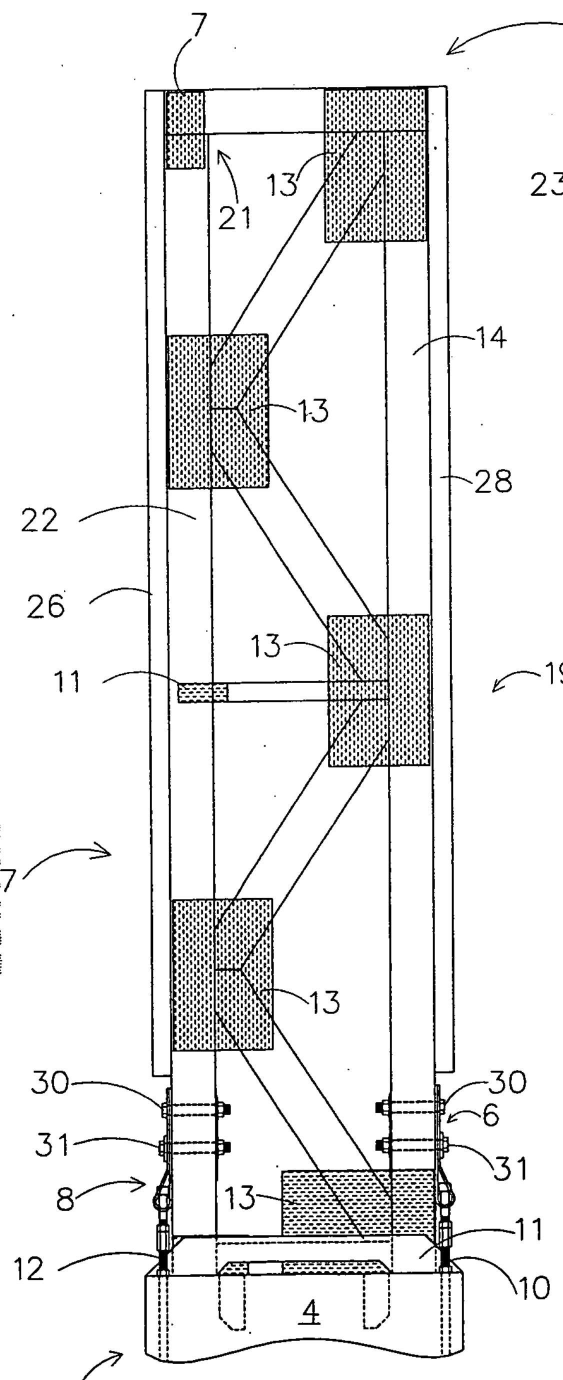

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FIG.—1

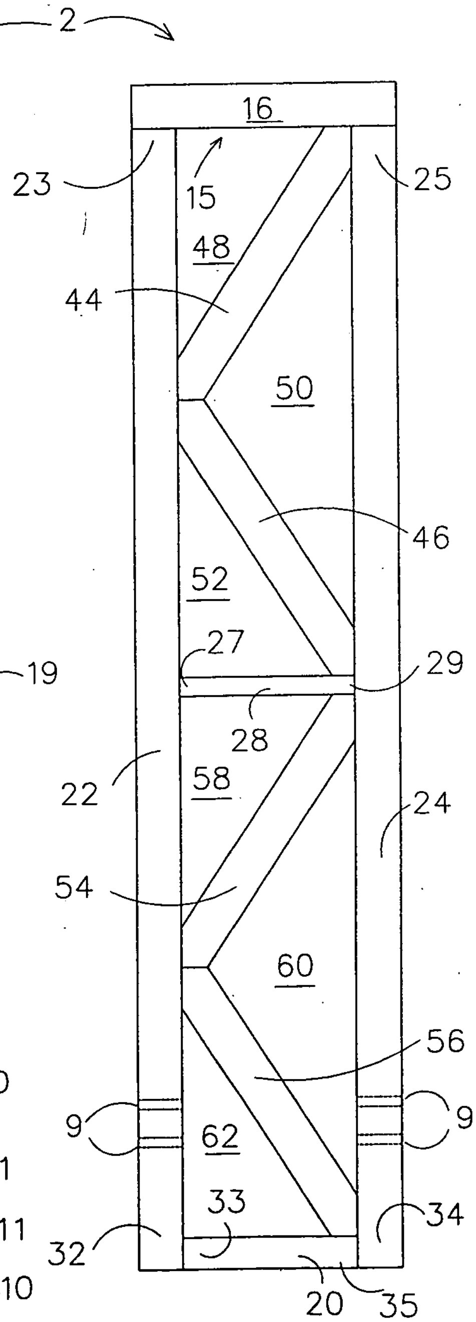

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FIG.—2

(b). This change has the effect of providing a flat bearing surface within a side member such as side member 22 when the lateral force resisting system is under load. This is useful to adapt to variations in the quality, grain, and moisture content of side members such as side member 22.

Those skilled in the art will appreciate that the various adaptations and modifications of the just described preferred embodiment can be configured without departing from the scope and spirit of the invention. Therefore, it is to be understood that, within the scope of the appended claims, the invention may be practiced other than as specifically described herein.

tooth 705 in Fig. 14(b) secure reinforcing plates 208 and 210 to side member 22 such that each reinforcing plate bolt hole is concentric with imbedded sleeves such as sleeves 243 and 245 after sleeves 243 and 245 are pressed into a side member such as first side member 22.

Referring now to Fig. 14(a)-(b), reinforcing plate 700 is fabricated to have a plurality of teeth such as tooth 705 to secure reinforcing plate 700 in place. Punches such as punch 701 are made in reinforcing plate 700 to create teeth such as tooth 705. Areas 704 and 706 adjacent to holes 702 and 703 respectively are free of punches 701.

Rigid structural panel 2 is further secured to foundation 124 using holdowns such as holdown 6 and 8. In the preferred embodiment of the present invention, holdown straps 211 and 214 are folded metal strap of 3/16" steel, although any other suitable material may be used. Pin 216 and 218 fit within folded holdown straps 212 and 214 respectively. Holdown straps 211 and 214 are slotted, as shown in Fig.16(a), to accommodate holdown screws such as screws 220 and 222. Screws 220 and 222 extend perpendicular to the longitudinal axis of pins 216 and 218 respectively. In a further aspect of the present invention, each holdown 6 and 8 is secured to rigid structural panel 2 using an upper bolt 30 and a lower bolt 31. For first side member 22, upper bolt 31 penetrates holdown strap 212, first reinforcement plate 211, first side member 22, sleeve 243, second reinforcement plate 213, and inner reinforcement bar 215. Threaded end 232 may be secured by nut 205 against a first plate washer 255. Lower holdown bolt 31 penetrates retaining plate 246, holdown strap 212, first reinforcement plate 211, side member 22, sleeve 245, second reinforcement plate 213, and inner reinforcement bar 215. The threaded end may be secured by nut 207 against plate washer 255. The threaded end of holdown screw 31 secures rigid

604 and joins bolt platforms 602, tie plate 613, and bolt platform 604 along inside edge K-K'. A plurality of fastener points 611 on outside face 612 allow foundation bolt placement template 600 to be temporarily fastened to an outside form, such as form 501 of Fig. 26(a), during fabrication of foundation 619. Temporary attachment of foundation bolt placement template 600 to an outside form such as form 511, allows accurate placement of foundation bolt placement template 600 which supports foundation bolts such as bolt 516. Securing tabs 618, 620 and 622 are captured within the wet concrete of foundation 619 during fabrication, and provide lateral force resistance at the frame/foundation interface after foundation 619 has hardened. After foundation 619 has hardened, temporary fasteners securing foundation bolt placement template 600 may be removed. Outside face 612 may be folded about 90°, as shown in Fig. 10(b), along indented and perforated fold line J-J'. A rigid structural panel such as rigid structural frame 300 of Fig. 5 may be secured between inside face 610 and outside face 612 using a plurality of fastener points such as fastener point 611.

Referring now to Fig.'s 11(a)-(c) foundation bolt placement template 630 is a further aspect of the present invention. Foundation bolt placement template 630 includes bolt platforms 632, and 634, inside face 640, outside face 642, tie plates 643 and 645, and securing tabs 646, 648, 650 and 652. Bolt platforms 632 and 634 are generally horizontal and include holes 636 and 638 respectively. Holes 636 and 638 are provided to allow foundation bolts such as bolt 633, to hang through bolt platforms 632 and 634, supported by foundation bolt nuts such as nut 635, during fabrication of foundation 631. Bolt platform 632 and tie plate 643 are separated by concrete access 654, tie plate 643 and tie plate 645 are separated by concrete access 656, bolt platform 634 and tie plate 645 are separated by concrete access 658, concrete

invention. Foundation bolt placement template 560 includes bolt platforms 562 and 564, inside face 572, outside face 570, center bolt platform 574, and removable bolt supports 584-588. Bolt platforms 562 and 564 and center bolt platform 574 are generally horizontal and include holes 566, 568 and 580 respectively. Holes 560, 568 and 580 are provided to allow foundation bolts such as bolt 593, 594 and 595 to hang through bolt platforms 562, 564 and 574 respectively, during fabrication of foundation 596. Bolts 593 and 594 are supported by foundation bolt nuts such as nut 597 and 598, during fabrication of foundation 596. Bolt platforms 562 and 564 are separated by concrete access 582 which allows wet concrete to be easily poured through foundation bolt placement template 560 during fabrication of foundation 596. Outside face 570 foldably joins bolt platforms 562, 564 and center bolt platform 574 along indented and perforated fold line E-E'. A plurality of fastener points 520 on outside face 570 allow foundation bolt placement template 560 to be temporarily fastened to an outside form, such as form 501 of Fig. 26 (a), during fabrication of foundation 596. Inside face 579 foldably joins bolt platforms 562 and bolt platform 564 along indented and perforated fold line F-F'. A plurality of fastener 520 on inside face 572 allow foundation bolt placement template 560 to be temporarily fastened to an inside form, such as form 507 of Fig. 26(a), during fabrication of foundation 596. Temporary attachment of foundation bolt placement template 560 to forms such as forms 501 and 507 allows accurate placement of foundation bolt placement template 560 which supports foundation bolts such as bolt 593-595. With foundation bolt placement template 560 temporarily fastened to forms such as forms 501 and 507, removable bolt supports 584, 586, and 590, are folded along intended and perforated fold lines I-I', H-H' and G-G' respectively, such that adjacent faces form 90° angles resulting in removable

horizontal and include holes 503 and 505 respectively. Holes 503 and 505 are provided to hang foundation bolts such as bolt 516 through bolt platforms 502 and 504, supported by foundation bolt nuts such as nut 518, during fabrication of foundation 514. Bolt platforms 502 and 504 are separated by concrete access 511 which allows wet concrete to be easily poured through foundation bolt placement template 500 during fabrication of foundation 514. Outside face 508 foldably joins bolt platforms 502 and 504 along indented and perforated fold line A-A'. A plurality of fastener points 520 on outside face 508 allow foundation bolt placement template 500 to be temporarily fastened to outside form 501, as shown in Fig. 26(a) below, during fabrication of foundation 514. Temporary attachment of foundation bolt placement template 500 to outside form 501 allows accurate placement of foundation bolt placement template 500 which supports foundation bolts such as bolt 516. Securing tabs 510 and securing tab 512 are captured within the wet concrete of foundation 514 during fabrication of foundation 514 and provide lateral force resistance at the frame/foundation interface after foundation 514 has hardened. After foundation 514 has hardened, temporary fasteners securing foundation bolt placement template 500 to outside form 501 may be removed to allow outside form 501 to be removed. Outside face 508 may be folded about 90° along indented and perforated fold line A-A'. A rigid structural panel such as rigid structural frame 2 may be secured between inside face 506 and outside face 508 using a plurality of fasteners (not shown) through fastener points such as fastener point 520. Inside face 506 is perpendicular to bolt platforms 502 and 504 and joins bolt platforms 502 and 504 along inside edge B-B'.

Referring now to Fig.'s 8(a) and (b), foundation bolt placement template 530 is another aspect of the present

of the joint, that is, the front and back of the joint, to secure the joint. A 20 Ga. truss plate such as plates 7 and 11 is used. for joints of only two members A joint of three or four members uses an 18 Ga. truss plate such as plate 13. A joint of five or more members uses a 16 Ga. truss plate such as plate 301 of Fig.'s 5 and 6.

Referring now to Fig. 6, another aspect of the present invention is shown in which rigid structural panel 400 is configured for applications requiring a 5 1/2 - 8 1/2 foot wide lateral force resistance panel. Rigid structural panel 400 includes sill plate 420, perpendicular to first side member 424, such that first end 430 of sill plate 420 abuts side 423 of bottom end 422 of first side member 424. Sill plate 420 is also perpendicular to second side member 428, such that second end 432 of sill plate 420, abuts side 427 of bottom end 426 of second side member 428. First side member 424 is parallel to second side member 428. Vertical support 402 is perpendicular to sill plate 420, such that bottom end 404 of first vertical support 402 abuts top point 410 of sill plate 420. Second vertical support 476 is perpendicular to sill plate 420 such that bottom end 482 of second vertical support 476 abuts top point 484 of sill plate 420. Top member 438 is perpendicular to first side member 424 such that bottom side 437 of first end 440 of top member 438, abuts top end 434 of first side member 424. Top member 438 is perpendicular to first vertical support 402 such that bottom point 411 of top member 438 abuts top end 406 of first vertical support 402. Top member 438 is perpendicular to second vertical support 476 such that bottom point 480 of top member 438 abuts top end 478 of second vertical support 476. Top member 438 is also perpendicular to second side member 428 such that bottom side 437 of second end 442 abuts top end 436 of second side member 428. Horizontal spacing members 412, 472, and 414 are about equidistant between sill plate 420 and top member 438. First

this embodiment, rigid structural panel 200 provides vertical support for header 110. Foundation bolt placement template 202 locates and supports foundation bolts such as bolt 204 during fabrication of foundation 124. Foundation bolt placement template 202 also attaches to sill plate 20, bottom end 32 of first side member 22, and bottom end 34 of second side member 24 to further secure frame/foundation interface 107. Two holdowns such as holdown 206 are attached to the outside of panel 200 to further secure panel 200 to foundation 124.

Referring now to Fig. 5, another aspect of the present invention is shown in which rigid structural panel 300 is configured for applications requiring a 3 1/2-6 1/2 foot wide lateral force resistance panel. Rigid structural panel 300 includes sill plate 320, perpendicular to first side member 324, such that first end 330 of sill plate 320 abuts side 323 of bottom end 322 of first side member 324. Sill plate 320 is also perpendicular to second side member 328, such that second end 332 of sill plate 320, abuts side 327 of bottom end 326 of second side member 328. First side member 324 is parallel to second side member 328. Vertical support 302 is perpendicular to sill plate 320, such that bottom end 304 of vertical support 302 abuts top center 310 of sill plate 320. Top member 338 is perpendicular to first side member 324, such that bottom side 337 of first end 340 of top member 338, abuts top end 334 of first member 324. Top member 338 is perpendicular to vertical support 302, such that bottom point 311 of top member 338 abuts top end 306 of vertical support 302. Top member 338 is also perpendicular to second side member 328, such that bottom side 337 of second end 342 abuts top end 336 of second side member 328. Horizontal spacing member 312 is about equidistant between sill plate 320 and top member 338. First end 316 of horizontal spacing member 312 abuts first side member 324 and second end 318 of

Detailed Description of the Preferred Embodiment(s)

Figure 1 is a front view of one embodiment of the present invention, showing rigid structural frame 2, secured to foundation 4, by foundation bolt placement template 14 and holdowns 6 and 8 engaged to foundation bolts 10 and 12 respectively. Furring boards 26 and 28 are attached to first side member 22 and second side member 24 respectively, to allow building frame members such as stud 115 and trimmer 114 of Fig. 4 below, to be attached at side 17 and side 19 respectively.

Referring now to Fig. 2, a front view of one aspect of the present invention is shown in which rigid structural frame 2 is configured as a vertical truss for applications requiring a 1-31/2 foot wide lateral force resistance panel. Rigid structural frame 2 includes sill plate 20 perpendicular to first side member 22, such that first end 33 of sill plate 20 abuts bottom end 32 of first side member 22. Second side member 24 is also perpendicular to sill plate 20 such that second end 35 of sill plate 20 abuts bottom end 34 of second side member 24. First side member 22 is parallel to second side member 24. Top member 16 is perpendicular to first side member 22 such that bottom side 15 of top member 16 abuts top end 23 of first side member 22, and bottom side 15 similarly abuts top end 25 of second side member 24. Horizontal spacing member 28 is approximately equidistant between top member 16 and sill plate 20. First end 27 and second end 29 of horizontal spacing member 28 abut first side member 22 and second side member 24 respectively. Within the rectangle formed by top member 16 , first side member 22, second side member 24 and horizontal spacing member 28, are first web member 44 and second web member 46, which form triangles such as structural support triangles 48, 50 and 52. Within the rectangle formed by sill plate 20, first side member 22, and

FIGURE 13(a)-(b) are views along sections N-N′ and O-O′ of Fig. 12 respectively.

FIGURE 14(a)-(b) are two views of a reinforcing plate showing the bolt holes and the teeth.

FIGURE 15(a)-(c) are views of various holdown straps showing different bolt holes.

FIGURE 16(a)-(c) are views of the currently preferred embodiment of a holdown strap according to the present invention.

FIGURE 17(a)-(b) are views of a sleeve for use with the bolt of Fig.21(a).

FIGURE 18(a)-(b) are views of a sleeve for use with the bolt of Fig.22(a).

FIGURE 19(a)-(b) are views of a steel pin for use with the screw of Fig.23 and the straps of Fig.'s15(a)-(c).

FIGURE 20(a)-(b) are views of a steel pin for use with the screw of Fig.24 and the strap of Fig.'s16(a)-(c)..

FIGURE 21(a)-(b) are views of a round bodied bolt.

FIGURE 22(a)-(b) are views of a square bodied bolt.

FIGURE 23 is a side view of a chamfered capscrew for use with the pin of Fig.'s 19(a)-(b).

FIGURE 24 is a side view of a capscrew for use with the pin of Fig.'s 20(a)-(b).

FIGURE 25(a)-(b) are views of a "T" bolt for use with the straps of Fig.'s 15(a)-(c).

FIGURE 26(a)-(b) are perspective views of a stem wall foundation corner showing how a foundation bolt placement template is tacked onto the form before the concrete is poured, and after the concrete is cured, the forms are removed and the foundation bolt placement template is field bent to form a channel to accept a rigid structural frame.

FIGURE 27(a)-(b) are perspective views of a slab foundation corner showing how a foundation bolt placement template is tacked onto the form before the concrete is poured, and

and the foundation bolt. A lock nut tightens against the coupling nut to prevent the coupling nut from loosening.

In a still further aspect of the present invention, the metal pin and transverse screw may be replaced by a 'T' bolt.

will provide greater uniformity in building construction and greater lateral force resistance through elimination of attachment problems in sheathed shearwalls and an improved frame/foundation interface. The lateral force resisting system may be used in wood frame as well as metal frame buildings.

The rigid structural panel may be compatible with standard North American framing dimensions, that is, framing members having 2x4, 2x6, 2x8 cross section dimensions. In one aspect of the present invention, a vertical truss may be used as the rigid structural panel, however other configurations may be used with suitable results.

The foundation bolt placement template is provided to improve the frame/foundation interface. In another aspect of the present invention, securing tabs of the foundation bolt placement template may be captured within the wet concrete, and bolts to secure the rigid structural panel may be correctly located on the foundation and set to protrude the correct distance out of the foundation. The foundation bolt placement template minimizes obstruction of the concrete form, thus allowing wet concrete to be poured through the center of the foundation bolt placement template. After pouring the concrete, the outside face of the template may be folded up to form a channel to accommodate the sill plate and side members of the truss. The inside and outside faces of the foundation bolt placement template have fastener attachment points to further secure the rigid structural panel at the frame/foundation interface. In another aspect of the present invention, the inside and outside faces of the foundation bolt placement template are temporarily secured to the forms to accurately locate the foundation bolts. After the forms are removed, both the inside and outside faces may be folded up to further secure the rigid structural panel.

Narrow sheathed shearwalls are also common adjacent to window and door openings.

The interface between the shearwall and the foundation may also be area of weakness. The conventional practice of locating holdowns within the framework of a sheathed shearwall weakens the sheer wall and the frame/foundation interface. Bolts imbedded in the concrete of the foundation provide attachment points for the walls and shear panels. These bolts are intended to pass through the mudsill of the sheathed shearwall to prevent lateral movement between the sheathed shearwall and the foundation. The foundation bolts also transfer the lateral load from the top of the sheathed shearwall to the foundation. Quite often the bolts which are supposed to secure the walls and shear panels are placed several inches away from where they are required for optimum load transfer and ease of wall construction due to inaccurate measuring and carelessness during field installation of the bolts. The resulting misalignment forces some of the framing members to be trimmed to fit, or in some cases, the intended foundation bolt must be cut off and a "redhead" must be used. A "red head" is a bolt forced into a hole drilled into the foundation. The resulting attachment of the wall to the foundation is a potential point of failure.

Another common fabrication error is oversize holes in the mud sill. The mud sill is the base member of a wall frame which is in direct contact with the foundation. Inaccurate measuring and carelessness in drilling the mud sill during framing of the walls often result in holes in the mud sill which don't line up with the bolts placed in the foundation / stem wall. This requires extra holes, or oversize or elongated holes be created in the mud sill which weakens the frame / foundation interface.

The steel attachment hardware which connects the shearwall to the foundation is another point of weakness. If a field

place. Once adjacent wall frames are in place, they are nailed together at the corners and an additional plate (top cap) is added which overlaps the top plates of adjacent wall frames.

Once the wall frames are in place the supports for the ceiling may be attached. The ceiling supports are called ceiling joists, and they rest on and are attached to the walls at the top cap. The joists are parallel to the foundation and span the distance from one wall in a room to the opposite wall in the room. After the ceiling joists are in place, the roof is framed. The roof framing members (rafters) are also attached to the top cap. In many buildings the ceiling joists and the roof framing are combined by the use of trusses. A roof truss is generally triangular and is composed of the roof rafters and the ceiling joists all prefabricated together of usually 2"x4" boards.

After the building frame is completed, the building is ready to be sheathed. Conventional building construction uses sheathing inside a building (drywall) which forms the wall surface which we all see, and sheathing on the roof which helps keep the building dry. Plywood or other sheathing is also applied to the outside and sometimes the inside walls of every building. The panel created by many nails driven through the plywood or drywall into the supporting wall studs, mud sill and top plates creates a sturdy vertical diaphragm known as a sheathed shearwall. Drywall or gypsum sheathing provides insulation and fire resistance and some structural stability. The structural contribution of a drywall panel are limited because of the relatively delicate composition of the drywall. Where higher lateral force resistance is required builders and designers generally use plywood or particleboard or fiberboard sheathing fastened to the wall frame. Plywood is the most common choice and will be used hereafter, but other suitable materials may be used. Plywood is available in

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LATERAL FORCE RESISTING SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates generally to the field of building construction and in particular to structural framing elements for building construction.

2. Descriptions of the Prior Art.

The vast majority of buildings are wood frame construction. Wood frame buildings are subjected to many forces. Among the most significant are gravity, wind, and seismic forces. Gravity is a vertically acting force, wind and seismic forces are primarily lateral (horizontal). Many wood frame buildings use shearwall panels to resist lateral loads. A shearwall panel is formed by the application of one or more types of sheathing such as, plywood, fiberboard, particleboard, and or drywall (gypsum board), to the inside or outside or both sides of a wall frame. The sheathing is fastened to the wall frame at many points creating a shearwall panel. Many suitable fasteners are available, nails are commonly used and will be referred to hereafter. The sheathed shearwall panel is used to conduct the lateral force acting on the frame of the building to the foundation.

Buildings require a strong base for support. Most buildings have a concrete base which is generally referred to as the foundation. A concrete pad whose top forms a continuous plane from edge to edge is called a slab. With a slab the concrete forms the floor of the building. The deepest concrete support which follows the perimeter of the building is called the footing. In a building without a concrete floor, the floor may be supported by short concrete walls called stem walls which are supported by the footing. Some grading

9. Identification of documents accompanying this cover sheet:

A. Documents required by 37 C.F.R. §§ (a)(2)(ii)–(iii):

Specification: No. of pages 27

Drawings: No. of sheets 14

B. Additional documents:

☐ Claims: No. of claims ______

Note: A complete provisional application does not require claims. 37 C.F.R. § 1.51(a)(2).

☐ Power of attorney

☒ Small entity statement

☐ Assignment

☐ Other

NOTE: Provisional applications may be filed in a language other than English as set forth in existing § 1.52(d). However, an English language translation is necessary for security screening purposes. Therefore, the PTO will require the English language translation and payment of the fee mandated in § 1.52(d) in the provisional application. Failure to timely submit the translation in response to a PTO requirement will result in the abandonment of the provisional application. If a 35 U.S.C. 111(a) application is filed without providing the English language translation in the provisional application, the English language translation will be required to be supplied in every 34 U.S.C. 111(a) application claiming priority of the non-English language provisional application. Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,209.

10. Fee

The filing fee for this provisional application, as set in 37 C.F.R. § 1.16(k), is $150.00, for other than a small entity, and $75.00, for a small entity.

☒ Applicant is a small entity.

NOTE: "A verified statement in compliance with existing § 1.27 is required to be filed in each provisional application in which it is desired to pay reduced fees." Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,197.

11. Small entity statement

☒ The verified statement(s) that this is a filing by a small entity under 37 C.F.R. §§ 1.9 and 1.27 is(are) attached.

12. Fee payment being made at this time

☐ Not enclosed

☐ No filing fee is to be paid at this time. (This and the surcharge required by 37 C.F.R. § 1.16(l) can be paid subsequently).

☒ Enclosed

Total fee enclosed $ 75.00

WARNING: *A provisional application may be abandoned by operation of 35 U.S.C. 111(b)(5) on a Saturday, Sunday, or Federal holiday within the District of Columbia, in which case, a nonprovisional application claiming benefit of the provisional application under 35 U.S.C. 119(e) must be filed no later than the preceding day that is not a Saturday, Sunday , or Federal holiday within the District of Columbia. Notice of April 14, 1995, 60 Fed. Reg. 20,195 at 20,202.*

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 C.F.R. 1.53(b)(2).

1. The following comprises the information required by 37 C.F.R. § 1.51(a)(2)(i)(A):

2. The name(s) of the inventor(s) is/are (37 C.F.R. § 1.51(a)(2)(i)(B)):

NOTE: While the name or names of the inventors are required in order to accord a provisional application a filing date, a provisional application is not required to be signed by the inventor or the assignee. No oath or declaration is required. Presumably, most provisional applications will be filed by a registered practitioner without a power of attorney being filed. Notice of December 5, 1994, 59 FR 63591, at 63594.

NOTE: "The naming of inventors for obtaining a filing date for a provisional application is the same as for other applications. A provisional application filed with the inventors identified as 'Jones et al.' will not be accorded a filing date earlier than the date upon which the name of each inventor is supplied unless a petition with the fee set forth in § 1.17(i) is filed which sets forth the reasons the delay in supplying the names should be excused. Administrative oversight is an acceptable reason. It should be noted that for a 35 U.S.C. 111(a) application to be entitled to claim the benefit of the filing date of a provisional application the 35 U.S.C. 111(a)[,] application must have at least one inventor in common with the provisional application." Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,209.

The term "invention" is typically used to refer to subject matter which applicant is claiming in his/her application. Because claims are not required in a provisional application, it would not be appropriate to reference joint inventors as those who have made a contribution to the "invention" disclosed in the provisional application. If the "invention" has not been determined in the provisional application because no claims have been presented, then the name(s) of those person(s) who have made a contribution to the subject matter disclosed in the provisional application should be submitted. Section 1.45(c) states that "if multiple inventors are named in a provisional application, each named inventor must have made a contribution, individually or jointly, to the subject matter disclosed in the provisional application." All that § 1.45(c) requires is that if someone is named as an inventor, that person must have made a contribution to the subject matter disclosed in the provisional application. When applicant has determined what the invention is by the filing of the 35 U.S.C. 111(a) application, that is the time when the correct inventors must be named. The 35 U.S.C. 111(a) application must have an inventor in common with the provisional application in order for the 35 U.S.C. 111(a) application to be entitled to claim the benefit of the provisional application under 35 U.S.C. 119(e). Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,208.

"If all the names of the actual inventor or inventors are not supplied when the specification and any required drawings are filed, the provisional application will not be given a filing date earlier than the date upon which the names are supplied unless a petition, with the fee set forth in § 1.17(q), is filed, which sets forth that the reasons for the delay in supplying the names should be excused." 37 C.F.R. § 1.53(b)(2).

	GIVEN NAME	MIDDLE INITIAL OR NAME	FAMILY (OR LAST) NAME
1.	Timothy	L.	Timmerman
2.	Timothy	L	Timmerman II
3.			

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